8. An RF quadrupole ion trap for the storage of externally generated ions, comprising:

(a) an ion trap with end cap and ring electrodes, and an injection hole in one of the electrodes,

(b) a generator for generating an RF drive voltage,

(c) a series of coaxial aperture diaphragms designed as a travelling field apparatus, acting as an injection device for injecting the externally generated ions, and

(d) a generator for generating a multi-phase AC voltage for the travelling wave field apparatus.

9. The ion trap as in claim 8, wherein the diaphragms are sequentially connected with output phase voltage connectors of the multiple phase alternating voltage generator.

10. The ion trap as in claim 9, wherein the AC voltages of the multi-phase alternating voltage generator are superimposed with DC voltages.

11. The ion trap as in claim 8, wherein the multi-phase alternating voltage generator produces a voltage with a basic frequency which corresponds to the frequency of the RF generator for the drive voltage of the ion trap or an integral fraction of the RF frequency.

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